Foodborne Illness Information

from the Working Group on Foodborne Illness Control

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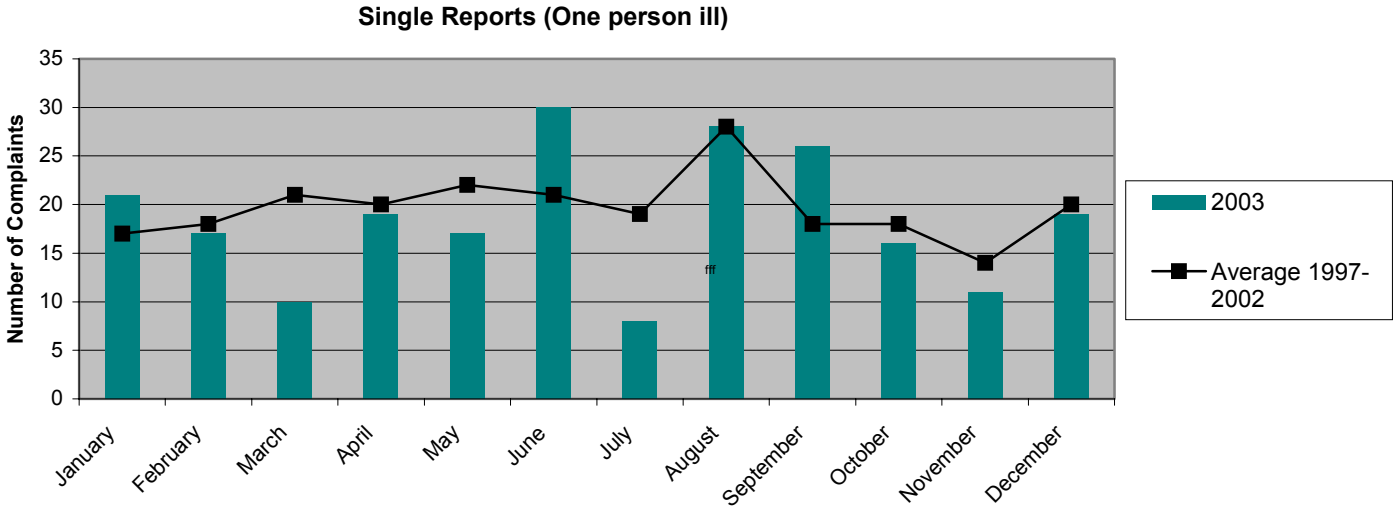
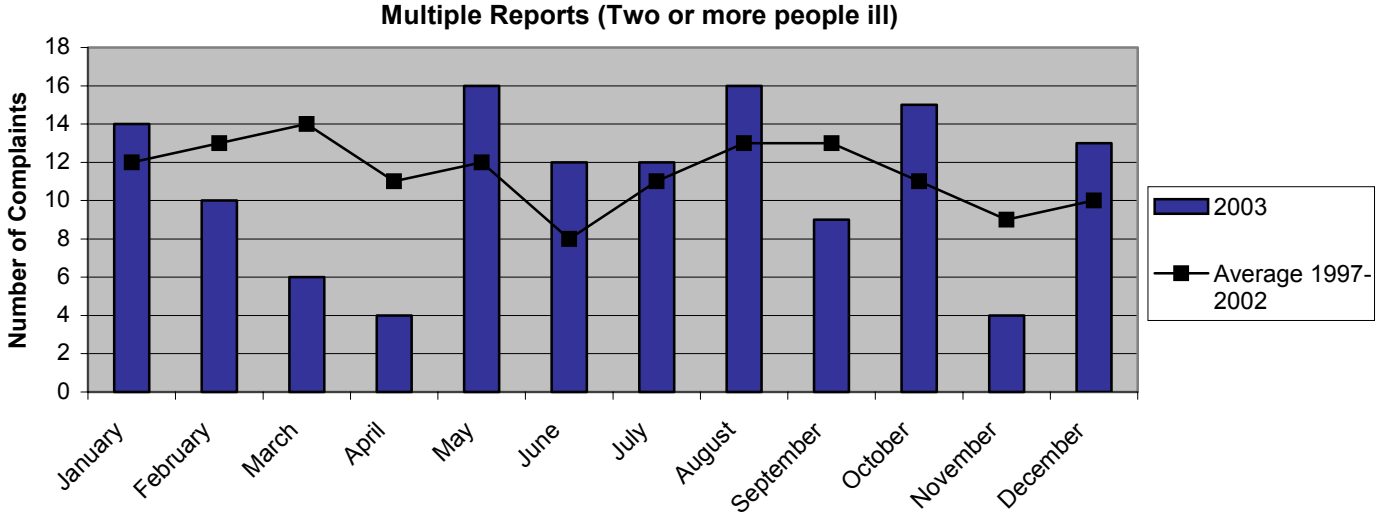
In this issue:

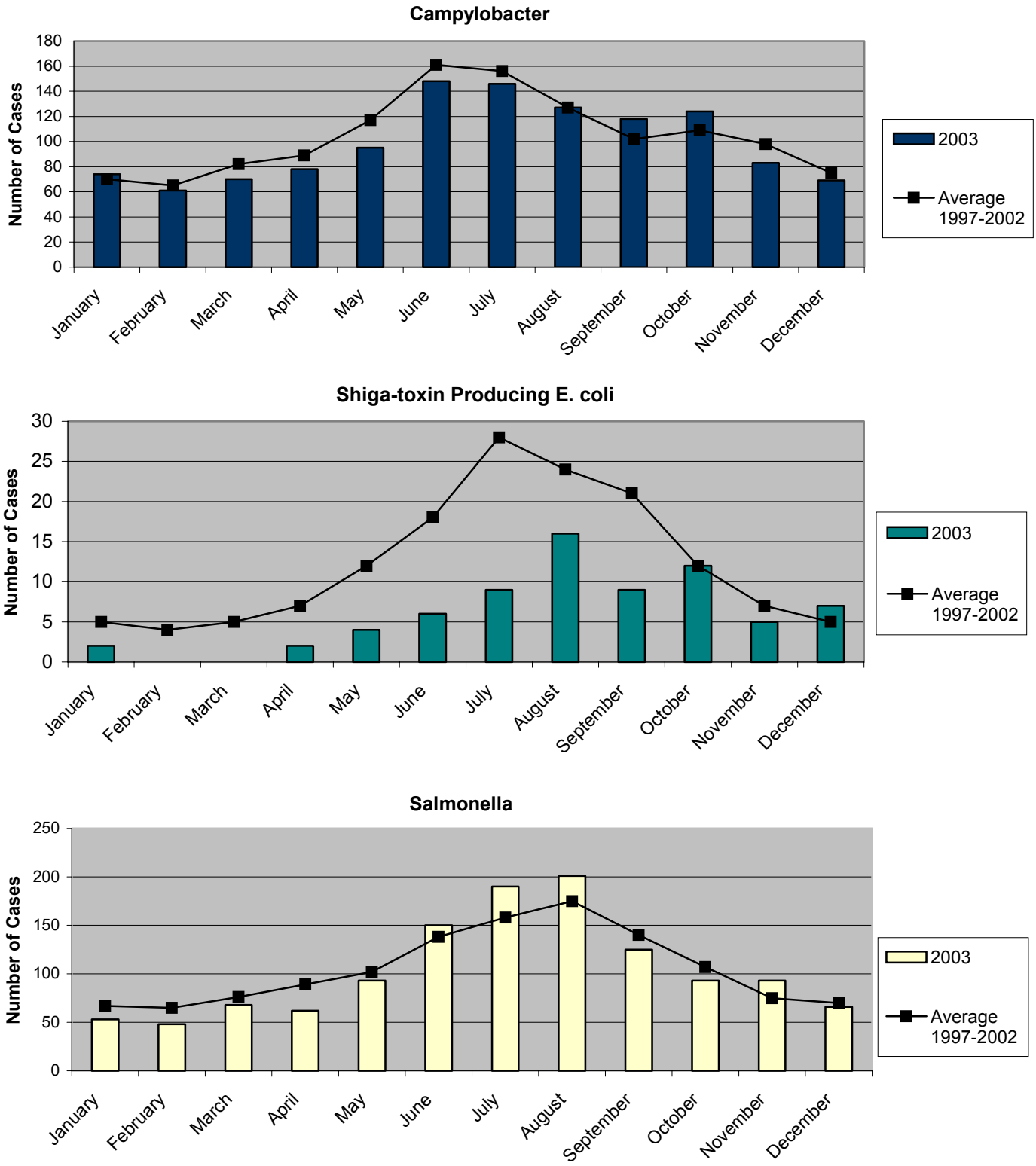
Monthly Statistics

Complaints Received by the Working Group on Foodborne Illness Control (Confirmed and Unconfirmed): 2003





Laboratory Confirmed Cases of Campylobacter, Shiga-toxin producing E. coli and Salmonella Reported to the Division of Epidemiology and Immunization: 2003*

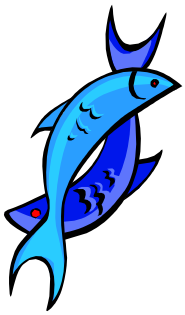


* Number of cases recorded as of February 9, 2004. Number of 2003 cases may change due to delays in reporting and data entry.

What's New in Foodborne Illness: Outbreaks and Information

Ciguatera Poisoning, July 2002

by Frauke Argyros, MS



Case Report:

Ciguatera toxin originates from single-celled, microscopic dinoflagellates, which sporadically occur in the plankton of tropical waters of the Atlantic and Pacific oceans. Dinoflagellates are food for many small marine fish and invertebrates, which in turn are fed upon by larger fish. As a result, ciguatera toxin accumulates along the food chain and is more likely to be present in significant amounts in larger reef fish species, such as grouper, red snapper and barracuda. Barracuda in particular is one of the top predators, and can contain levels of ciguatera toxin high enough to cause illness in humans.

Ciguatera poisoning occurs infrequently in Massachusetts. Between 1997 and 2002, five complaints representing fourteen cases of ciguatera poisoning were received by the Massachusetts Department of Public Health (MDPH). In three of these complaints, barracuda was the suspect food item, causing 12 people to become ill. Six of these people had consumed barracuda in a restaurant, while the other six ate barracuda that had been purchased at a market and prepared at home. The latest outbreak occurred in July 2002.

On July 15, 2002, the Division of Food and Drugs (DFD) at MDPH was notified that five people had become ill after eating at the same restaurant in a town south of Boston on July 13. The five people were from two different parties, and all had eaten the "special of the day", which was a barracuda dish. The cases became ill approximately 1½ to 3½ hours after eating the meal. Initial symptoms included diarrhea, nausea, vomiting, abdominal cramps, and two cases experienced bradycardia (slow heart rate). All of the cases were treated in a local hospital emergency room.

On July 17, the local board of health was notified by the hospital that a sixth person was suffering from similar symptoms. This case had also eaten barracuda at this establishment on July 13.

Four days after consuming the barracuda, three cases began experiencing neurological symptoms, including itchiness, numbness and tingling of the extremities. Gastrointestinal symptoms, followed by the development of neurologic symptoms, are consistent with ciguatera poisoning. Symptoms for these cases continued for more than a week. No other cases were identified by the hospital or health agents of the town.

Leftover frozen fish was submitted to the State Laboratory Institute (SLI) for analysis on July 17. The samples collected from the establishment consisted of three whole raw fillets and cooked pieces of barracuda that were part of the same fish that had been served to one of the cases.

Even though it was likely that all cases were suffering from ciguatera poisoning based on the characteristic food history and the clinical signs, bacteriological and chemical analyses were performed to eliminate other potential causative agents. The Food Microbiology Laboratory at SLI did standard plate counts, coliform counts and staphylococcal counts on all the samples. All these counts were within normal limits.

The Analytical Chemistry Laboratory at SLI tested for the presence of histamine, which can be associated with clinical signs such as nausea, vomiting, diarrhea, flushing and tingling of the face and chest. Histamine is also an indicator of bacterial decomposition and can be found when fish is time-temperature abused. Certain fish species are prone to production of histamine during spoilage. Barracuda does not usually pose a histamine hazard, but in response to the seriousness of the illnesses this test was included to rule out histamine (scombroid) poisoning. The Analytical Chemistry Laboratory detected 0.27 parts per million (ppm) histamine in the cooked sample, and <0.25 ppm in all raw samples. These are acceptable levels, since the Food and Drug Administration's (FDA) action level for decomposition is 50 ppm histamine, and the action level for histamine as a human health hazard is 500 ppm histamine.

A portion of each sample was further analyzed for ciguatera toxin at the FDA's Gulf Coast Seafood Laboratory at Dauphin Island, Alabama. Food sample analysis for this toxin is not routinely performed at SLI since ciguatera poisoning occurs mostly in southern coastal regions, and regional laboratories have the expertise for the testing method required. The FDA laboratory reported that the cooked barracuda pieces contained 30 parts per billion of ciguatera toxin, which is considered high enough to cause clinical symptoms. The three samples of raw fish did not contain any detectable toxin.

A trace back of the barracuda by DFD revealed that the fish had been distributed by seafood wholesalers in Florida. They had purchased the fish directly from fishing boats, which typically target other fish species and only catch barracuda accidentally in their nets.

The exact fishing areas where the barracuda had been harvested could not be determined. The Florida Health Department and FDA were contacted, and one of the seafood distributors initiated a voluntary recall of barracuda that included fish delivered to Minnesota and New York. No related illnesses were reported from these two states.

In response to this outbreak, on July 29, MDPH released a 'Barracuda Fish Consumption Advisory' advising all persons to refrain from eating barracuda. No new cases of ciguatera poisoning have since occurred in Massachusetts. MDPH is considering banning the sale of barracuda in Massachusetts since it is difficult to ensure that this species of fish is safe to eat.

General Information about Ciguatera Toxin:

Ciguatera toxin is heat-stable and cannot be destroyed by cooking or freezing. It cannot be detected by inspection, taste or smell. The only way to prevent ciguatera poisoning is to prevent the harvesting of large fish from areas that are known to have high levels of ciguatoxin or to avoid eating all large reef fish.

People suffering from ciguatera intoxication may experience nausea, vomiting, abdominal cramps and diarrhea within hours after eating contaminated fish. Some people will also experience tingling and numbness around the mouth which may spread to the extremities. Typically, twelve to eighteen hours later, some cases will develop neurological symptoms such as temperature sensory reversal (hot things feel cold and cold thing feel hot), acute sensitivity to temperature extremes, vertigo, increased numbness or tingling and headaches. Some may develop cardiovascular symptoms such as arrhythmias, slow or fast heart rates, or decreases in blood pressure.

Diagnosis of ciguatera poisoning is based on the characteristic combination of gastrointestinal and neurological symptoms and food history. There is currently no clinical test to confirm the diagnosis. Development of neurological symptoms may be slightly delayed (as occurred in this outbreak) which can confuse the diagnosis and result in a delay in the recognition of the disease.

Symptoms associated with ciguatera intoxication last for an average of 8-9 days. While the disease is rarely fatal, it can be uncomfortable in mild cases and debilitating in more severe cases. In addition, in a small percentage of cases neurological symptoms can continue for months or even years. On rare occasions, after initial improvement, symptoms may resurface months and years later. There is no effective treatment or antidote available for ciguatera poisoning, and only supportive treatment to alleviate symptoms can be provided. Ill persons with suspected ciguatera poisoning should seek medical care immediately, contact their local health departments as soon as possible and save any uneaten portions of fish in a freezer.

For more information on Ciguatera Poisoning see http://www.cfsan.fda.gov/~mow/chap36.html

Norovirus Testing at the State Laboratory Institute

by John Fontana, PhD

In May 2002, the Enteric Laboratory at the State Laboratory Institute (SLI) began norovirus (formerly Norwalk-like virus) testing of stool specimens as part of foodborne illness outbreak investigation. Since testing began, the laboratory has received 288 specimens, with 81 positives from 10 outbreaks. Several of these have been large-scale foodborne outbreaks. Since norovirus is thought to be responsible for most foodborne illness in the US[1], the addition of this test by the Enteric Laboratory has helped identify the cause of several outbreaks as due to noroviruses.

Norovirus causes a self-limiting illness, which is characterized by acute onset of nausea, abdominal cramps, vomiting and diarrhea. Symptoms typically resolve within 12-60 hours. Due to the short duration of illness, testing for norovirus is used to aid epidemiological investigations, not as a diagnostic tool. Outbreaks must meet criteria for viral gastroenteritis before testing will be approved. Local health departments wishing to submit samples for norovirus testing must call the Division of Epidemiology and Immunization at 617-983-6800 for approval prior to submitting specimens.

Within 48 hours of onset of symptoms specimens should be collected in a clean, sterile container, such as a sterile urine specimen cup. Transport media must not be added, as it interferes with viral extraction. Specimens must be kept cold, but not frozen, and delivered to SLI on ice within 48 hours of collection. A completed test requisition form must accompany each specimen, and an epidemiology approval form must be submitted for each outbreak.

Typically, results are available in one week.

The technique used for norovirus testing is called reverse transcriptase-polymerase chain reaction (RT-PCR). This complex procedure consists of a two-step process of amplification of noroviral RNA followed by gel electrophoresis. If the stool sample contains norovirus, a band of DNA appears on the gel. No band indicates there is no norovirus in the stool sample.

Soon, real-time PCR technology will be introduced, which will increase the number of samples that can be tested, as well as decrease reporting time. In addition, DNA sequencing methods, already in use at the U.S. Centers for Disease Control and Prevention, are being implemented at the state level to compare strains of noroviruses from multiple outbreaks.

Food contamination by infected foodhandlers is a frequent cause of norovirus outbreaks, as fewer than 100 viral particles can cause illness in others.

In February 2003, norovirus was added to the list of reportable diseases in 105 CMR 300.130, the Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements. These regulations require that any food handling facility employee who tests positive for norovirus be excluded from food-handling duties for either 72 hours past the resolution of symptoms or 72 hours past the date the last positive specimen was provided, whichever comes last.

For more information about norovirus or norovirus testing, please contact the Massachusetts Department of Public Health, Division of Epidemiology and Immunization at (617) 983-6800 or the Food Protection Program at (617) 983-6712.

1. Paul S. Mead, Laurence Slutsker, Vance Dietz, Linda F. McCaig, Joseph S. Bresee, Craig Shapiro, Patricia M. Griffin, and Robert V. Tauxe. Food-Related Illness and Death in the United States. Emerging Infectious Diseases 5:607-629, 1999.

Surveillance of Foodborne Illness in Massachusetts

By Frauke Argyros, MS

The U.S. Centers for Disease Control and Prevention (CDC) estimate that 76 million cases of foodborne illness occur in the U.S. each year. As part of the effort to reduce foodborne illness, public health agencies monitor foodborne disease trends, determine the prevalence of foodborne pathogens, and track the foods implicated in foodborne illness outbreaks. These tasks are accomplished by systematically collecting case and illness information on the local, state and federal level to create a nationwide surveillance program.

Surveillance is categorized as either passive or active. Passive surveillance occurs when health agencies are contacted by cases, physicians or laboratories, which report illnesses or laboratory results to them. In active surveillance, the health agencies regularly contact physicians and laboratories to make sure that reportable diseases have been reported and required clinical specimens or isolates have been forwarded to state laboratories for further analysis.

Foodborne illness surveillance is mainly conducted through passive reporting of disease by consumers, physicians and laboratories. There are several ways that reports are received by the Massachusetts Department of Public Health (MDPH). Consumers may report a suspect foodborne illness to the local health department (LHD) or directly to MDPH. Illnesses reported by consumers are often not laboratory-confirmed; however, they are often still valid complaints and should be investigated. The Working Group on Foodborne Illness Control (WGFIC) at MDPH tracks all complaints from consumers in an electronic database. In 2003, WGFIC received 353 complaints of suspect foodborne illness, two-thirds of which were reported first to LHDs and then forwarded to the state.

When an ill person has a laboratory-confirmed foodborne disease, the healthcare provider is required to report the case to the LHD. In addition, the clinical laboratory that conducted the diagnostic test is required to notify MDPH[1]. The epidemiologists at MDPH collect reports of laboratory-confirmed cases. This allows MDPH to track the incidence of various diseases, detect clusters and monitor changes in pathogen prevalence and distribution.

In addition, for some enteric pathogens, the clinical laboratories send the isolate to the Enteric Laboratory at the State Laboratory Institute (SLI) for confirmation and further characterization. The Enteric Laboratory requests the submission of isolates of *Salmonella, Shigella, Campylobacter, Yersinia* and *Vibrio* and shiga-toxin producing *E. coli* such as *E. coli* O157:H7. Once in the laboratory, the identification of isolates is confirmed, and they are further identified to species level (e.g., *Campylobacter jejuni*). The laboratory will identify the serotypes[2] of pathogen species, look for specific virulence markers and toxins produced by these organisms, and analyze the DNA of the isolate by pulsed-field gel electrophoresis[3]. This additional information makes it

possible to compare pathogens isolated from different sources (e.g., food and cases), identify links between separate events, recognize and investigate outbreaks in a timely fashion, and observe changes in the prevalence of certain pathogen types. In some cases, rare or atypical isolates are sent to CDC for confirmation and/or more advanced testing, such as bacteriophage[4] typing for *Salmonella* and testing for other types of *E. coli*.

To supplement passive surveillance, an Active Surveillance Project was initiated by MDPH in October 2001. The goal of the project is to identify bioterrorism events, foodborne and waterborne outbreaks and emerging pathogens of interest in a timely fashion. MDPH epidemiology staff contact hospital laboratory supervisors and infection control personnel to request aggregate reports of active surveillance organisms on a weekly or monthly basis. Currently, 52 laboratories are reporting regularly.

As part of this system, data are requested for 17 pathogens, including potential bioterrorism agents such as *Bacillus anthracis* (Anthrax) and *Francisella tularensis* (Tularemia); foodborne pathogens such as *Salmonella* species and *E.coli* O157:H7; and potential waterborne pathogens such as *Giardia lamblia* and *Cryptosporidium* species.

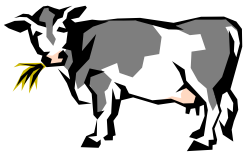
Another goal of the project is to monitor trends in antimicrobial resistance. MPDH requests antimicrobial resistance results on all of the 17 active surveillance organisms, when available. In addition, methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococci were added to the revised list of reportable diseases in February 2003.

Reporting of most foodborne illness is done through passive surveillance. Because most passive reporting is prone to under-reporting, it is difficult to measure the impact of foodborne illness in the U.S. accurately. Active surveillance is used to gather data that more accurately reflect the occurrence and severity of foodborne illnesses. It also allows for more timely reporting of illness, and enhanced identification and investigation of foodborne illness outbreaks. However, active surveillance is labor-intensive and costly and is usually limited to diseases of specific interest.

1. For a list of reportable diseases in Massachusetts, see http://www.state.ma.us/dph/cdc/bcdc.htm
2. Serotype: A species or sub-species is subdivided based on immunologic criteria (antigenic characteristics)
3. See "Pulsed Field Gel Electrophoresis", Foodborne Illness Information Newsletter, October 2003: http://www.state.ma.us/dph/fpp/retail/newsletter.htm
4. Bacteriophage typing: Bacteriophages ("phages") specifically infect bacteria only. Specific bacteria are usually infected by specific bacteriophages, and the identity of these phages will be used to indirectly identify the bacterium.

Food Safety Web Links

Foodborne Illness Education Information Center
http://www.nal.usda.gov/foodborne
The USDA/FDA Foodborne Illness Education Information Center provides information about foodborne illness prevention to educators, trainers, and organizations developing education and training materials for food workers and consumers.



Information on Bovine Spongiform Encephalitis (BSE):
FDA http://www.fda.gov/oc/opacom/hottopics/bse.html
USDA http://www.fsis.usda.gov/oa/topics/bse.htm
CDC http://www.cdc.gov/ncidod/diseases/submenus/sub_bse.htm

CDC's Health Related Hoaxes and Rumors
http://www.cdc.gov/hoax_rumors.htm